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FISH MYCOBACTERIOSIS (Tuberculosis)

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INTRODUCTION

The etiologic agent for the bacterial disease, "fish tuberculosis" (more correctly "mycobacteriosis"), was first observed in carp in 1898 from a pond in France. Subsequently similar agents have been isolated from or observed in fish in fresh water, salt water, and brackish water, in fish in aquaria, hatcheries, and natural habitat, (wild populations of fish). The disease has been recognized as an important infection among hatchery reared salmonid fishes on the West Coast of the United States, and in aquarium fishes such as the neon tetra, the Siamese fighting fish, and in salt water fish held in zoological displays.

IDENTIFICATION

The only reliable method for detecting this disease is by observing the acid-fast organism in tissue smears stained by the Ziehl-Neelsen method. Mortality data from this disease are incomplete for most species of fish. The disease seems to be primarily chronic, requiring long periods of time to effect its destruction. On occasion it may be the cause of epizootics among aquarium stocks and hatchery-reared juvenile salmon and is thought to be the cause of losses in high-seas populations.

There are no external symptoms in young salmon. There may or may not be external symptoms in the adults; if symptoms are present they may include a stunted appearance, a lack of secondary sexual development, and a brighter than normal color. Internal gross pathology may include undeveloped sex organs; varied, gray, irregular lesions or pustules scattered throughout the kidney, liver, and spleen; and masses of the organism forming false membranes in the mesenteries and around the intestine and caeca. Nodular lesions are often found along the intestines of infected adult salmon. Tissue smears prepared from the intestine may be a more reliable method of diagnosis than smears prepared from other viscera.

In aquarium fishes the disease usually manifests itself by increased mortality. Occasionally, external symptoms such as a creamy, slightly raised growth may be present; rarely, great masses of open, raw, relatively deep skin lesions. Internal pathology is similar to that of the salmon. Tubercles have been described in the neon tetra and from cod and halibut taken on the high seas.

CAUSE OF THE DISEASE

The etiologic agent is a small (1-3μ x 0.3-0.7μ), non-motile, gram-positive, acid-fast

rod belonging to the genus Mycobacterium. Several species have been described, each one coming from a different type of fish or environment.

SOURCE AND RESERVOIR OF INFECTION

The source of infection has not been positively established, but in the hatchery fish it is probably infected fish flesh and viscera used as part of the diet. Diseased fish are most likely the reservoir of mycobacteria causing infections in fishes. The organism from neon tetra has been found to be viable in tank water for more than four days. This viability may be true of organisms from other fish and could constitute a second source of infection as well as serve as a short duration reservoir in tanks and ponds.

MODE OF TRANSMISSION

This has not been positively established, but it is thought to be transmitted in the feed. Raw fish, or fish products, obtained from even lightly infected fish, without visible internal or external gross symptoms, should be considered as a very likely source of fish pathogenic mycobacteria. Feeding experiments by various investigators seem to substantiate this hypothesis; however, the water ingested or filtered over the gills may also transmit the disease to susceptible fish.

INCUBATION PERIOD

Not positively established. Experimental results indicate that the infection may become established in as short a time as six weeks of light feedings of the organisms; however, no mortalities were recorded for the disease after six months of infection. An extremely virulent strain might become established in a shorter time and cause high mortalities in less than the experimental period.

SUSCEPTIBILITY AND RESISTANCE

All species investigated appear to be susceptible. There are no apparent resistant species although no experimental work has been done to verify this observation. Populations of fish in unnatural crowded conditions such as hatchery ponds and aquarium tanks appear more susceptible than those in their natural environment. The etiologic agent has been found in almost all types of fish and all types of fish and all types of environment.

RANGE

Worldwide.

OCCURRENCE

Fish mycobacteriosis is chiefly a problem of hatcheries and aquaria, but it is also found in wild populations of fishes.

METHOD OF CONTROL

A. Preventive Measures

Discontinue feeding infected material and improve sanitary measures.

B. Therapy

No satisfactory treatment is known. Experimental chemotherapeutic studies indicate that there are inhibitory agents, but these have not proven successful in controlling all strains of the infectious agent.

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